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BY

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BY ELIOT GORTON, M.D.,
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FROM March 1 to April 25, 1893, we were afflicted with an epidemic of pneumonia following influenza, during which time there came under my personal observation and care 63 cases of pneumonia, all among the female insane and their nurses.

I should deem myself culpable did I not take this opportunity of placing before the medical profession a summary from the records of these cases, many of which were typical and need no special mention, while a few others were so obscure and misleading as to symptoms that the disease—while suspected by reason of the already large number stricken—could not be diagnosticated by any objective symptoms present, and it was left for the autopsy to establish the diagnosis. The hope that a summary of 63 cases of pneumonia may not be entirely devoid of interest to the profession at large, constitutes my apology for this paper.

A peculiar phenomenon in relation to this epidemic is the fact that for the first three weeks it was

¹ Throughout this article reference is made entirely to croupous pneumonia.

confined exclusively to the female wing of the building, not a single case of influenza appearing in the male wards during that time. While the disease was at its height among the females, the male side of the house was enjoying its usual good health, and when the disease finally did gain access thereto there were comparatively few cases, with not more than eight cases of pneumonia. The fact that this institution is all under one roof; that the male and female departments are exact counterparts, of similar structure, heated and ventilated in precisely the same manner, must also be borne in mind.

The etiology of pneumonia is at present an all-absorbing and disputed question, though the theory of a specific origin is becoming almost generally accepted. The pathologic investigations and experiments conducted during the past two years seem to indicate that we must give up our previously-conceived ideas as to causation, accept the pneumonia-coccus of Fraenkel, and class pneumonia among the acute infectious diseases.

While in the light of recent pathologic researches I am prepared to accept this theory, the question constantly forcing itself upon my mind is: Is it not possible and probable that we may have a specific and a non-specific form of this disease? It would seem to be without doubt, from my recent experience, that the epidemic form of the disease is of specific origin, yet I cannot at present bring myself to believe that every case of sporadic pneumonia met with in ordinary practice is due to a specific organism and is infectious.

We have Asiatic cholera, and no one doubts for a

moment its specific and infectious nature. We also have cholera morbus, or cholera nostras, a disease so identical with the first named, that in severe cases the microscope is a necessary adjunct to a differential diagnosis; yet, except it be during an epidemic of Asiatic cholera, no one pretends to confound the two. Why, then, may we not have two forms of pneumonia, identical in clinical manifestations, yet widely divergent as to cause?

Again, pneumonia is distinctly a disease in which one attack predisposes to another, and one individual may have any number of attacks, while in almost all other acute infectious diseases of specific origin, one attack usually grants immunity from a second. The epidemic form of the disease would point strongly toward an acceptance of the theory of specific origin without any further question, but pneumonia is seldom epidemic in character, and when so, is usually more malignant and therefore more fatal than in those cases that we term sporadic, and it is so probably by reason of a specific organism. In these latter cases, may not the pneumonia-cocci found in the sputa be rather a sequence of the inflammatory process than the cause? While the recent experiments of Kitasato, Behring, and the Klemperers seem to support most strongly the theory of specific origin, and they show apparently that they have granted immunity from the disease by the injection into the blood of pneumotoxin, yet in two cases about to be related in which there was undoubted pneumonia, and which made a good recovery—the lungs becoming clear and the patients resuming their work at the end of two weeks

in one case and of three weeks in the other—they became reinfected, and both cases died within three days after the second infection. Yet, according to our pathologists, these cases should have been proof against reinfection for at least six weeks. However, whether pneumonia is or is not always of specific origin, the question still remains to be definitely determined, and there is no doubt in my mind but that there are more individual causes of pneumonia than are or ever will be known to medical science.

The weather of February was cold and raw, while that of March was clear and unusually mild, though with cold winds. If atmospheric or telluric conditions play any part in the causation of pneumonia, the rather sudden change in our climate about the first of March may have been an important factor, for it was just at this time that influenza made its appearance. Yet, if so, how can we account for the fact that for so long it was confined exclusively to the female wing? This is suggestive that the cause may be looked for in some defective sanitary condition of that side of the house, though so far as is known at present the plumbing, system of sewage-disposal, and general sanitary condition of the house were never better. If we may still consider atmospheric conditions as a cause, our system of ventilation—that of drawing in air from the outside and forcing it through the wards to an exit in the roof—must be taken into consideration, and also in this connection, the overcrowded condition of the hospital. It would be interesting to know why all of these cases were preceded by influenza, and why there should have been 63 cases of pneumonia among the

females and but 8 among the males. Does the presence of this catarrhal affection render individuals more susceptible to infection—the inflamed mucous membrane with its altered secretion becoming a culture-medium for the pneumonia-cocci, the development of pneumonia depending upon individual predisposition, aided, perhaps, by certain atmospheric conditions with which as yet we are not familiar?

Whatever may be the cause, we have to deal with the fact that on or about March 1, 1893, influenza of a most severe type made its appearance in the hospital, and made no distinction in its ravages between the sane and the insane. Among the patients and nurses in the female department there were 176 cases of influenza, followed in 63 cases, or nearly 36 per cent., by pneumonia.

As a matter of convenience, I have grouped the cases in four classes, as follows:

Class I, typical cases, of which there were 24; Class II, cases in which the usual premonitory symptoms were absent, of which there were 33; Class III, cases in which there were no objective symptoms, of which there were 4; Class IV, cases in which the physical signs were present, with no special disturbance of temperature, pulse, or respiration, of which there were 2.

CLASS. I.—In every case the patient suffered from influenza, complaining of intense boneache, headache, backache, creeping chills, and coryza. The temperature ranged from 100° to 102° , and the pulse from 90 to 120. The acute symptoms subsided on about the third day and the patients felt much

better—so much better, in fact, that in the morning many left their beds against my advice—when toward evening or late in the evening, they were again seized with a severe chill lasting from five to fifteen minutes, the temperature rising to 104° or 105° , the pulse to 120, and they complained of a sharp, stabbing pain in the chest. The respirations were accelerated, and there was a cough, short, hacking, and suppressed, with very little expectoration of a frothy, tenacious mucus, which in a few cases was blood-tinged. On the second or third day the sputa became “rusty-colored,” the physical signs developed, and the patients presented the characteristic pneumonic appearance, with flushed and anxious countenance, temperature 102° or 103° in the morning, and from 103° to 105° in the evening; pulse from 100 to 110 in the morning, and from 120 to 130 in the evening; respirations from 40 to 60 and shallow; great restlessness and sleeplessness; anorexia, constipation, thirst, and coated tongue. The pain in the chest in most cases disappeared on about the fourth day, while in others it persisted throughout the entire illness and with such severity that it became necessary to use hypodermatics of morphin for its relief. In these 24 cases, the crisis occurred on the sixth day in 3; on the seventh day in 10; on the eighth day in 4; on the tenth day in 2; and 5 died on or about the ninth day of the disease at an average age of sixty and three-fifths years, the youngest being forty-six and the oldest seventy-four. The average age of the nineteen recoveries was forty-five. Of these cases the right lower lobe was affected in 9; the left lower lobe in 6; both lower lobes in 2; the entire

right lobe in 2 ; the entire left lobe in 1 ; the left apex in 2 ; the right apex in 2.

One case in particular deserves more than passing notice: On the fifth day of the disease one of the nurses, whose left lower lobe was affected and whose symptoms were all favorable, was seized with an urgent desire to defecate while the nurse in attendance was busy with another patient. She therefore disobeyed orders, and getting out of bed to use the commode, was taken with a violent chill. Her temperature, which had been 102° , rose to 105° , and in a few hours she complained of intense pain in her right side. On the following day the physical signs showed an extension of the inflammatory process to the right lower lobe, while the left was resolving. The expectoration became prune-juice in color, and on the morning of the third day thereafter, her temperature was 105° , pulse 160, respirations 65, with extreme dyspnea, cyanosis, delirium, picking at the bedclothes—in fact, symptoms of approaching death. Nitro-glycerin and strychnin were administered hypodermatically, and brandy and aromatic spirit of ammonia internally, with the effect of lowering the pulse to 150. Sponging with equal parts of alcohol and cold water reduced the temperature to 103° (sponging was resorted to whenever the temperature reached 104°), and oxygen gas was given for five minutes every half-hour. These methods were kept up for two days and nights, during which time her pulse continued at 150 and respirations at 60, when the crisis occurred, the temperature fell to normal, the pulse to 96, with a general subsidence of the alarming symptoms.

However, at the end of two days her temperature again rose to 102° and her pulse to 120. Examination revealed an extensive effusion in the right pleural cavity which at the present writing (May 6th) is not wholly absorbed, and the patient, while extremely weak, is gradually regaining her strength.

CLASS II.—As previously indicated, the usual premonitory symptoms of pneumonia were absent, and with the exception that in many there was also no pain, they were identical with those of Class I.

All suffered with influenza, but it was not until the fifth day that the physical signs of pneumonia developed, respirations became accelerated, and the sputa blood-tinged. There was no initiatory chill followed by a sudden rise in temperature; the pulse continued at from 100 to 120; except in a few cases no pain was complained of; the tongue, though coated with a white fur, was moist and the expectoration previously to the fifth day was bronchitic in character. Of these 33 cases, 5 were under thirty, 18 over fifty, and 10 over sixty years of age. Six died, of whom 2 were over seventy, 1 was fifty-one, and 2 were epileptics at twenty-seven and twenty-eight years of age. The average age at death was forty-nine and a half years.

CLASS III.—The four cases of this class were patients in the last stage of dementia, and were in an extremely adynamic condition owing to their want of exercise and long confinement. Their lack of vitality rendered them easy victims to the disease, and it is hardly to be wondered that their symptoms were not pronounced, and that they succumbed to the disease. But for the fact that others in practically

the same mental and physical condition contracted pneumonia and presented the usual symptoms, these would not be mentioned. I am frank to admit that had these cases come under my observation during a season of health, it would never have occurred to me to suspect pneumonia, for there were absolutely no objective symptoms, and if influenza developed previously to the pneumonia no one ever knew it. The patients simply did not feel well, and so stayed in bed. In no case was the pulse over 100, or the temperature over 102° , but in all the pulse was small, weak, and compressible. There was no cough, no expectoration, no pain, no acceleration of respiration, no dyspnea, no cyanosis. Exploration of the chest gave a practically negative result, and the physical signs were so obscure that a positive diagnosis of pneumonia could not be made. It was merely suspected, and the autopsy confirmed the suspicion. The inability to obtain clear and unmistakable physical signs in these cases may be attributed to their slow manner of breathing, for in counting the respirations the movement of the chest-walls was almost imperceptible.

Niemeyer, in his *Text-book of Practical Medicine*, vol. i, page 179, says: "In aged persons or subjects of depraved constitution . . . many have no characteristic sputa; nor do they complain either of dyspnea or pain . . . the physician having been deceived by external appearances, which really bear greater resemblance to typhus than to pneumonia of vigorous adults, and having neglected to make a physical exploration of the chest."

To me these cases were interesting and instructive, and I am now convinced that many of the aged and feeble demented who die from no apparent cause except a gradual failure of the vital powers may die instead from asthenic pneumonia.

These four cases were aged respectively fifty, fifty-one, fifty-two, and sixty-two.

CLASS IV.—These two cases were peculiar and interesting from the fact that the temperature ranged from 97° to 99° ; the pulse from 70 to 80; respirations from 16 to 24. In both, a small portion of the right lower lobe was affected; both, it may be well to say, were nurses, one of whom suffers from an organic lesion of the heart. The characteristic pneumonic sputa and pain were present, lasting about three days. Yet, when these patients were considered well enough to leave their beds, on assuming the upright position the pulse ran up to 120, and the feeling of nervous exhaustion and prostration was extreme. They made a slow recovery and were among the last to have again the feeling of well-being. I am unable to account for the clinical phenomena presented by these two cases, except it be on account of the small area of lung involved. Yet we know that often in such cases the severity of the symptoms is out of all proportion to the amount of lung-tissue involved.

Of the two cases alluded to previously who became reinfected, little need be said. One was a case of senile dementia, aged seventy-four, who was one of the first to contract pneumonia. From the first attack she apparently made a good recovery, and was about the ward helping with the work.

Three weeks later she again developed the disease, and from the beginning her symptoms were extremely grave and pronounced. She died on the third day. The second case was that of a colored woman, aged fifty-one, who had been admitted to the hospital a short time previously, suffering from acute mania. As she recovered from her period of excitement she contracted pneumonia and recovered by lysis—the only case of recovery, strange to say, which did not terminate by crisis. She was apparently well for two weeks, when she again contracted pneumonia and died on the third day of the disease.

Complications. The complications in the whole number of cases were comparatively few, though not unimportant. An exhausting diarrhea requiring treatment was present in three cases; jaundice appeared in one; pericarditis in two; pleurisy developed in two-thirds of the cases, and meningitis was entirely absent. In no case was delirium a marked symptom.

Sequelæ. About one-half of these cases made an uninterrupted recovery. The remainder were left in an extremely nervous, weak, and prostrated condition, from which they recovered slowly. In several otitis media developed, and in a few others symptoms of heart-failure occurred when they attempted to sit up in bed; symptoms of nervous prostration were severe in all.

Mortality. When we take into consideration the fact that fifty-five of these patients were afflicted with the various forms of insanity; that a few, owing to their delusions, were difficult to manage,

and (owing to the number of nurses sick) could not be constantly watched, it is surprising that the death-rate was not higher.

Of the 15 deaths, 11 were cases of senile or terminal dementia; 3 of epileptic dementia; 1 of recent acute mania. It will therefore be seen that death took place in those patients whose vitality was at a low ebb, and who, enfeebled by age, by epilepsy, by sickness, and by long confinement, were in no condition to withstand the ravages of a disease acknowledged by all authorities to be one of the most fatal of the acute diseases.

The ages at death in the 11 cases of senile or terminal dementia were as follows: 60, 46, 74, 50, 52, 70, 67, 62, 50, 73, 51. The average age was $59\frac{6}{11}$. In the 3 cases of epileptic dementia the ages were 27, 28, 65; of the cases of recovery from acute mania, 51.

SUMMARY.

Influenza	176 cases.
Pneumonia occurred in { patients, 55 }	63 cases, or 36 pr. ct.
nurses, 8 }	
Deaths from pneumonia (all patients)	15 cases, or 23.8 pr. ct.
Average age at death	55 years.

Treatment. Since the days of Rasori, when pneumonia was treated by bloodletting and two-scruple doses of digitalis, and patients were bled daily until either their symptoms became more favorable or they died, we have steadily advanced; and as our knowledge of pathologic anatomy has become more exact, we have come to a more conservative and rational method of treating pneumonia.

The expectant plan of treatment now almost universally in vogue, since physicians have accepted the fact that pneumonia is an acute self-limiting disease, still has for its opponents those who hold that, in the beginning, antiphlogistic and depleting methods of treatment exert a favorable influence upon or abort the disease.

Whichever method is the more rational—and from personal experience I can testify to the greater efficacy of the expectant plan—our text-books, while agreeing that the indications are to keep the temperature within bounds and to support the heart, are not altogether agreed as to the better way of accomplishing the desired result. Some recommend quinine in large doses at the beginning; others have their own favorite antipyretics, while, to support the heart, digitalis and alcohol have been extensively used.

Dr. Osler¹ says: “No certainty has as yet been reached as to the value of digitalis in the failing heart of fever. The practice is very general, but it is a drug to be used with caution in this condition.” Niemeyer² says: “Digitalis has been extensively employed and with great justice in the treatment of pneumonia . . . with a pulse of from 100 to 120 in frequency.”

The physiologic action of digitalis is “to prolong diastole, increase the vigor of systole, and increase arterial tension.” Again, to quote Niemeyer, page 174: “The small soft pulse is due, not

¹ In his recent *Practice of Medicine*, page 531.

² In his *Text-book of Practical Medicine*, vol. i, p. 191.

to weakness of cardiac contractions, but to lack of blood in the left ventricle, which causes a deficit in the supply of the aortic system. The left ventricle is imperfectly filled because afflux of blood to it is obstructed."

Patients with pneumonia, except when an unusually large amount of lung-tissue is involved, die at the heart and undoubtedly because the heart is in a great measure deprived of its necessary rest and nutrition, and the heart-muscle itself is disorganized by the high temperature to which it is subjected for so long a time. It seems to me, therefore, that in the rapid pulse of pneumonia, great harm can be done by the administration of digitalis, for the heart, already weak from overwork, is made still more so by that drug. The effect of digitalis is to temporarily lower the pulse-rate *and increase the vigor of the contractions*, thereby really *increasing* instead of *diminishing* the work the heart has to do. The obstruction in the lungs is not removed, arterial tension is increased, and when the effects of the drug wear away the heart is left much weaker than before. I am indebted to Dr. Thomas P. Prout, pathologist to this hospital, for the statement that in 30 per cent. of his autopsies on the insane the heart was in a state of marked fatty degeneration. In this condition, so predisposing to heart failure, digitalis would certainly be an unsafe drug, and it is a condition which should always be borne in mind, even in the treatment of the sane. In my experience with this disease, nitro-glycerin in small doses, repeated often if necessary, has been more than a substitute for digitalis, and I have been more than pleased

with its effect. In every case in which it was used the pulse-rate slightly diminished in frequency and arterial tension was lowered, thereby temporarily relieving some of the strain upon the heart and also relieving collateral hyperemia. Strychnin, as a nerve and cardiac tonic, in doses of from one-sixtieth to one-thirtieth of a grain, repeated every two hours and oftener if necessary, cannot be too highly extolled, and in my opinion alcoholic stimulants are indispensable.

My own cases, with two exceptions, were treated on the expectant plan. Jacket poultices of flaxseed meal, renewed as often as they lost their heat, were applied and covered with cotton batting. As an expectorant (or placebo), ammonium chlorid in brandy was given in small doses every two or three hours. Aconite and veratrum were also used at the beginning, but with no appreciable effect. Patients were confined to a diet of milk, eggs, and beef-tea, and the bowels were kept open by the use chiefly of warm-water enemata (glycerin suppositories were used in a few cases with negative results). In the few cases in which the temperature had a tendency to rise above 104° , sponging with equal parts of alcohol and cold water was resorted to with excellent results. No antipyretic medicines were used, except at the commencement of the influenza, when a few powders, containing five grains each of antipyrin and phenacetin, were given to relieve the distressing aching. Morphin hypodermatically in one-fourth grain doses was given unhesitatingly when necessary for the relief of pain, with no unfavorable result. From the fourth day the patients

were given strychnin sulfate, from one-sixtieth to one-thirtieth of a grain, with two drams of brandy every three hours, and these two remedies were increased or diminished in amount and frequency, according to the indications. Caffein citrate in from three-grain to five-grain doses, was used in a sufficient number of cases to convince me that it is a remedy of little value in this disease. In severe cases, with flagging heart, aromatic spirit of ammonia, with brandy, was given in connection with the nitro-glycerin and strychnin. In two cases, both nurses, one of which has been related at length, oxygen gas was also used, with the effect of relieving the cyanosis and dyspnea and lessening the rapidity of the respirations while being inhaled, but it did not lower the pulse-rate except in one instance, and I should wish to give it a more extended trial before expressing an opinion as to its value. It certainly did some good, and it seems to be a rational means of treatment, but many opinions have been expressed both for and against its use.

The two exceptions to this plan of treatment spoken of were given at the beginning ten grains of calomel, followed in six hours by a saline. Both cases died, but I do not by any means attribute their death to the initial treatment. I may also add that I have never seen any benefit from this method of treatment, and it does not seem reasonable to suppose that in any disease in which all the indications are to support the patient, exhausting measures, either at the beginning or at any other time, can abort the disease or be of any benefit to the patient.

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